

### **REMARKS**

The Applicant has now had an opportunity to carefully consider the Examiner's comments set forth in the Office Action of July 24, 2007. The allowance of claims 4-9 and the acknowledgement of allowable subject matter in claims 14 and 16-18 are noted with appreciation. Nevertheless, the rejections of claims 10-13, 15 and 19-23 in view of new grounds are respectfully traversed.

#### **The Office Action**

In the Office Action that was mailed July 24, 2007:

**claims 4-9** were allowed;

**claims 14 and 16-18** were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims;

**claims 10-13, 15 and 19-23** were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,612,793 to Ito et al. ("Ito") (note the Office Action refers to this patent as -- Akio -- at least once in the rejection).

#### **The Present Application**

Briefly, the present application is directed toward methods and systems for providing black and white copies of documents that were intended to be printed in color. More particularly, the methods and systems of the present application seek to preserve information that was encoded in the color of portions of, for example, a bar or pie chart image while, at the same time, minimizing changes to the image so that the methods and systems may be appropriately provided in a "walk-up mode" of, for example, a photocopier.

The color information is preserved by replacing it with a subtle pattern or texture. However, the pattern or texture is **only applied to portions of the image that conflict with other portions of the image**. That is, while there are millions of colors or shades of colors possible in a color image, a typical black and white printer might only be able to produce 256 shades of gray. Accordingly, many colors must be mapped or represented by any particular shade of gray. The methods of the present application look for colors in an image that would be mapped to the same shade of gray. When colors are found that would be mapped to the same shade of gray, **those colors are classified as conflicting**, and the subtle texture or pattern is applied to only those portions of the black and white image associated with conflicting colors.

Indeed, only some of the conflicting colors need receive a pattern or texture. For example, if an image includes two colors that would be mapped to the same shade of gray, only one of them need be modified to include a texture or pattern.

Accordingly, the method can be applied even to images that do not need the method, such as photographs, without noticeably distorting those images. Therefore, the method is appropriately applied in a "walk-up mode."

As recited in claim 10, the present application is related to an image processor operative to generate a single colorant version of a color image, the single colorant version including modulations only where necessary to distinguish between conflicting colors. The image processor includes an image analyzer operative to find and classify conflicting colors in the color image and a gray scale modulator operative to add spatial modulations to single colorant versions of only the conflicting colors within the single colorant version of the color image.

#### The Newly Cited Reference

In stark contrast, it is respectfully submitted that the newly cited reference to Ito discloses yet another example of an image processing apparatus that applies patterning to the black and white versions of all of the colors represented in a black and white version of an image. As explained at column 3, lines 9-11, the system of Ito detects color components of the color original by using a hue signal in order to reproduce the color image in monochrome patterns. Ito uses a histogram (e.g., Fig. 7 and Fig. 17) of filtered or smoothed image histogram data (e.g., Fig. 5) to find three hue ranges associated with three peaks (column 7, lines 1-3). If the histogram includes four or more peaks, the additional peaks are associated with one of the three bigger peaks. For example, if the fourth peak is between two other peaks, it is combined with the peak associated with the smaller range (column 7, lines 3-67). Once the three ranges (e.g., the hues between B and C, E and F, and H and I in Fig. 7 or between B and C, E and F, and C and I in Fig. 17) (column 7, lines 48-61). The hue thresholds are loaded into comparators associated with patterns and the image is scanned a second time (column 6, lines 5-15). Each pixel is compared to the various **hue** thresholds to determine which range it is associated with (column 6, lines 13-31). That information is delivered to a selector which selects a pattern. The pattern data is output to a multiplier where it is

multiplied by a value of a darkest portion of the pixel data (column 6, lines 31-40). Presumably, the result of that multiplication is used to drive a printing element. However, the applicant has been unable to find any discussion of this in Ito.

Contrary to the assertions of the Office Action, it is submitted that Ito does not disclose and image analyzer that is operative to find and classify conflicting colors or gray scale modulator operative to add spatial modulations to single colorant versions of only the conflicting colors within the single colorant version of the color image.

### **The Claims are not Anticipated**

**Claims 10-13, 15 and 19-23** were rejected under 35 U.S.C. §102(b) as being anticipated by Ito. However, it is respectfully submitted that these rejections are based on **clear error**.

For example, in explaining the rejection of **claim 10**, the Office Action cites portions of columns 3 and 4 and implies that the cited portions disclose an image discriminating unit that detects color components, which are accumulated in a histogram and classified based on a threshold of hue values. However, even if those assertions are correct, none of that discloses or suggests an image analyzer that is operative to find and classify conflicting colors in a color image. Ito does not disclose or suggest looking for, finding and classifying conflicting colors. It is respectfully submitted that Ito applies some pattern to the black and white versions of every color in an image.

Further in regard to **claim 10**, the Office Action asserts that Ito discloses the gray scale modulator operative to add spatial modulations to single colorant versions of only the conflicting colors within the single colorant version of the color image and cites column 1, lines 20-27 and column 2, lines 48-54 in support of this assertion. However, the cited portion of column 1 discusses a method wherein, first, the color information of an original is converted into color signals by a photoelectric conversion element such as a color CCD or the like. Areas which are determined on the basis of these color signals to have the same color are replaced with a predetermined pattern such as a dot, horizontal line, or wavy line pattern corresponding to the color. This pattern is then reproduced in a single color to reproduce a monochrome image, thereby realizing a visual effect similar to that obtained by reproducing a color image.

The cited portion of column 2 indicates that in a data processing unit, the colors of the image data are discriminated on the basis of digital signals and are converted into patterns corresponding to the respective colors. The respective patterns are converted into density data by a LOG conversion unit to be reproduced as a monochrome image by a printer.

It is respectfully submitted that nothing in the cited portions of column 1 and column 2 discloses or suggests adding spatial modulations to single colorant versions **of only the conflicting colors** within the single colorant version of a color image.

For at least the foregoing reasons, the rejection of **claim 10**, as well as **claims 11-13, 15** and **19-20**, which depend therefrom, are based on clear errors of fact and **claim 10** as well as **claims 11-13, 15, 19** and **20** are not anticipated by Ito.

With regard to **claim 12**, the Office Action asserts that column 7, lines 1-4 and 15-20 disclose a conflicting color detector.

However, column 7, lines 1-4 indicate that in the embodiment described above, patterning is performed with respect to three hue ranges, i.e., ranges having three peaks, in a histogram. If, however, a hue value histogram of an original image has four peaks, as shown in Fig. 17, patterning is not performed with respect to a hue range between positions L and K.

Lines 15-20 indicate that since the processing in steps S10 to S40 are described above, a detailed description thereof will be omitted. In steps S20 to S40, a peak, i.e., a maximum value, in a hue value histogram is detected. In addition, processing of detecting the range of the peak, i.e., a minimum value, is performed. When all the peaks to be detected, i.e., the maximum values, are detected by repeating this processing (step S60), the maximum value and minimum value detection processing is terminated.

It is respectfully submitted that nothing in these cited portions of column 7 discloses a conflicting color detector. Furthermore, nothing in the cited portions discloses a value evaluating histogram peaks to determine similarity, as suggested by the Office Action. Moreover, even if the cited portions of column 7 could be construed as disclosing evaluating histogram peaks to determine similarity, as asserted by the Office Action, nothing in that alone would disclose or suggest a conflicting color

detector. It is respectfully submitted that Ito applies a pattern to all colors in an image and does not search for conflicting colors and does not restrict patterning to only conflicting colors.

For at least the foregoing additional reasons, it is submitted that the rejection of **claim 12** is based on clear errors of fact and **claim 12** is not anticipated by Ito.

With regard to **claim 13**, the Office Action cites portions of columns 4-6. However, nothing in column 6, lines 5-20 discloses or suggests a color relationship discriminator operative to receive conflicting color classification information from an image analyzer. Furthermore, the thresholds referred to in the cited portions of columns 4 and 5 simply identify the ranges of colors that will be associated with one of three peaks or most common colors and therefore with pattern assignments. Nothing in column 4, line 65 - column 5, line 5 discloses or suggests a color relationship discriminator operative to determine a relationship between the color image pixel and the conflicting color.

For at least the foregoing additional reasons, the assertions of the Office Action with regard to **claims 13** represent clear errors of fact and **claims 13**, as well as **claims 14-18**, which depend therefrom, is not anticipated by Ito.

With regard to independent **claim 21**, the Office Action at once asserts that Ito discloses examining the image to find conflicting colors in the image and then, in an apparent acknowledgement that Ito makes no such disclosure, summarizes the cited portion of Ito as disclosing determining the brightness data; and using the brightness data and the histogram peaks in determining which pixels to apply a pattern.

However, even if the assertion of the Office Action were correct (which is disputed) even the summary provided by the Office Action of the disclosure of Ito does not disclose or suggest examining an image to find conflicting colors. Furthermore, the assertion that Ito discloses "determining which pixels to apply a pattern" is respectfully traversed. Nothing in Ito discloses or suggests anything other than applying a pattern to all pixels. As depicted in Fig. 7 and Fig. 17 and the text associated therewith, one way or another, Ito associates every pixel in the image of Ito with one of three ranges associated with one of three peaks and each of those peaks is associated with a pattern (e.g., column 6, lines 5-67).

Additionally, column 6, lines 12-20 and 29-35 do not disclose suggest selectively spatially modulating a portion of the single colorant version of the image that is associated with one of the conflicting colors as is recited in **claim 21**.

For at least the foregoing reasons, **claim 21**, as well as **claims 22-23**, which depend therefrom, are not anticipated by Ito.

With regard to **claim 23**, the Office Action asserts that Ito discloses examining the image to find color peaks in the image that have similar lightness and cites portions of column 3 and 7 in support of this assertion.

However, Ito does not disclose examining the image defined color peaks in the image that have similar lightness. It is respectfully submitted that the histograms of Ito depict pixel count versus **hue**. The cited portion of column 3 makes this abundantly clear. The cited portion of column 7 reads as follows: "Figs. 18A and 18B are flowcharts showing a procedure for determining threshold values." Since the processing in the steps S10 to S40 are described above, a detailed description thereof will be omitted. In steps S20 to S40, a peak, i.e., a maximum value, in a **hue** value histogram is detected. In addition, processing of detecting the range of the peak, i.e., a minimum value, is performed. When all the peaks to be detected, i.e., the maximum values, are detected by repeating this processing (step S60), the maximum value and minimum value detection processing is terminated, and it is checked whether the number of peaks is larger than three (step S61).

Clearly, the peaks referred to in the cited portion are related to a number of pixels associated with particular hue and Ito does not disclose or suggest examining the image to find conflicting colors by examining the image defined color peaks in the image that have similar lightness.

For at least the foregoing additional reasons, the rejection of **claim 23** is based on clear errors of fact and **claim 23** is not anticipated by Ito.

**CONCLUSION**

**Claims 1-3** were withdrawn with traversal. **Claims 4-23** remain in the application. **Claims 4-9** have been allowed. **Claims 14** and **16-18** have been identified as including allowable subject matter. For at least the foregoing reasons, **claims 10-13, 15** and **19-23** are also allowable and the application is in condition for allowance. Accordingly, an early indication thereof is respectfully requested.

No additional fee is believed to be required for this Response H. However, the undersigned attorney of record hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Deposit Account No. 24-0037.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to call Joseph D. Dreher, at Telephone Number (216) 861-5582.

Respectfully submitted,

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Date

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Rosanne Giuliani  
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Date: October 23, 2007